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REMARKS

Status of the Application

Claims 14-17 are pending in the case, claims 1-13 having been canceled by preliminary amendment dated January 22, 2004. Claims 14-17 have been amended, and new claim 18 has been added. The amendments and new claim are supported in the specification at page 4, lines 15-18; page 6, lines 18-22 (claim 14) and page 4, line 18 (new claim 18). The other claim amendments correct errors and the bases for these amendments should be self evident. No new matter has been added.

Claims 14, 15 and 17 stand rejected under 35 U.S.C. §102 while claim 16 stands rejected under 35 U.S.C. §103.

The Examiner's objection to Fig. 3 has been addressed, in the amended drawing, by removing the reference numeral 2 and the line with the arrow point directed generally to agitator assembly components flange 10, vane support 14 and vane 16. This reference numeral and line/arrow point are to the right of reference numeral 2 that is directed specifically to the agitator assembly. The amended drawing is attached and marked "Replacement Sheet" in the header.

Claim Rejections Under 35 U.S.C. §102

Claims 14, 15 and 17 have been rejected under 35 U.S.C. §102(e), and these claims, either individually or in different groupings, have also been rejected under 35 U.S.C. §102(b). In all, five 102(b) references have been cited. In light of the foregoing claim amendments and the remarks presented below, Applicant respectfully asserts that all of the novelty rejections have been addressed and either rendered moot or otherwise overcome. Applicant will conclude this section of the paper with remarks in summation, once each novelty rejection has been addressed in detail on the merits.

Claims 14, 15 and 17 have been rejected under 35 U.S.C. §102(e) as being anticipated by Yeh et al., U.S. Patent No. 6,852,156 (hereafter "Yeh"). The Examiner has asserted that Yeh discloses a reactor (the pre-mix tank 16), an agitator assembly (the impeller 21 driven by motor 25) and a dip tube (unlabeled) for introducing ozone into the pre-mix tank (Col. 5, lines 13-26). The reactor is merely a tank in which stirring means (the impeller) mix liquid reactants (the reactants are "agitated", Col. 3, line 7) and water (Col. 3, lines 40-50) and permit the ozone to contact the reactants. The introduction of ozone as small bubbles aids the agitation process (Col. 3, lines 7-8). The reactor in Yeh also requires a dispersive mixing apparatus 18 to which reactants and ozone are pumped by pump means 20 from pre-mix tank

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16 and are returned from apparatus 18 to tank 16. Thus, the pre-mix tank and the dispersive mixing apparatus form a loop that is in fact the entirety of the reactor assembly in Yeh. This loop, including a second reactor chamber 18 is essential to achieving the results of that invention, i.e., producing a low-viscosity, dispersible pigment solution Col. 3, lines 25-30). Therefore, the apparatus of Yeh provides a continuous flow process as opposed to a batch process. The impeller 21 is a "stirring device" (Col. 3, line 10) and not a mechanical deagglomerating device as in the instant invention.

The device of the invention, as set forth in the amended claims, calls for a stationary chamber 4 with a reactor 5 positioned coaxially inside the chamber. In one embodiment, new claim 18, the chamber is sealed. The agitator assembly 2 of the instant application comprises a flange 10, plurality of vane supports 14, plurality of vanes 16 and flexible metal coils 18 attached to the vanes to more thoroughly deagglomerate the pigment particles and to scrape any accumulated, agglomerated particles off of the inside wall of the reactor 5. As is readily depicted in Fig. 1, Fig. 2 and Fig. 4, the vanes 16 are coextensive with the interior length of the cylindrical reactor 5. The vanes are structurally distinct from the stirring impeller depicted in Fig. 1 of Yeh, and as noted above, function altogether differently. In the instant application, as the Examiner has duly noted, the tubular lance 20 is positioned distally from the exhaust end of chamber 4 to increase the dwell time within reactor 5 of plasma activated aqueous vapor. In Yeh, by contrast, the ozone is kept in contact with the pigment particles in aqueous solvent by circulating them through the loop comprising pre-mix tank 16 and dispersive mixing device 18. The functional equivalent of dwell time in Yeh is maintained as follows, please see Col. 3, lines 56-60:

"While the ozone and water are circulating through this loop, the pigment is slowly introduced into the pre-mix tank 16. The process is continued in this manner until the pigment is sufficiently oxidized and becomes self-dispersing."

In addition, the reactor of the instant application is equipped with means for generating oxygen plasma so that the ozone or other process gases introduced into the reactor are plasma-activated.

For the foregoing reasons, the structures of claims 14, 15 and 17, as amended, do not read on Yeh. Therefore, Yeh does not anticipate the embodiments of the invention set forth in these claims. Applicant respectfully submits that his rejection should be withdrawn.

Claims 14 and 17 have been rejected under 35 U.S.C. §102(b) as being anticipated by Breneman et al., U.S. Patent No. 4,690,810 (hereafter "Breneman"). Breneman discloses a

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galss-lined steel vessel 10, paddles 60 and 70 for stirring the bath 20 and a lance 50 for introducing contaminated chlorosilane stream into CaO slurry. The vessel of Breneman is structurally distinct from the reactor assembly 1 of the instant invention as set forth in amended claim 14. The paddles 60 and 70 stir the reactant bath while the agitator assembly 2 of the instant application deagglomerate organic pigment particles. The paddles and the vanes 16 with attached flexible stainless steel coils 18 are structurally and functionally dissimilar. Breneman discloses nothing in relation to the lance 50 to indicate that its structure or placement within the vessel maximize the time during which gas phase and liquid phase reactants may remain in contact within the vessel. Applicant respectfully submits that the apparatus of claims 14 and 17 do not structurally read on the apparatus disclosed in Breneman and that these two claims are not anticipated by Breneman. This rejection should be withdrawn.

Claims 14, 15 and 17 have been rejected under 35 U.S.C. §102(b) as being anticipated by Hongo, Japanese Publication No. 11-060979 (hereafter "Hongo"). In Hongo, the rough phthalocyanine pigment is treated with ozone in the processing container 1 [0011] prior to substantial processing by mechanical grinding and atomizing *after* such initial ozone processing [0008]. The container is nothing more than a simple reaction tank with a simple mechanical stirring apparatus, the aerofoil 6 which appears to be a simple vane or propeller that rotates near the bottom of the tank. There is nothing to indicate that the stirring means 6 can perform any function other than to move the liquid reactants about in the bottom of the container 1. There is nothing in Fig. 1 of Hongo to indicate that there is any criticality to the placement of the unlabeled inlet means for ozone generator 2. That inlet means could presumably be any suitable means for providing an ozone ambient atmosphere above the fluid level within the container 1. As discussed in detail hereinabove, amended claim 14 calls for a chamber 4 and a reactor 5 positioned coaxially therein, an agitator assembly 2 that is capable of deagglomerating large particles of organic pigment, means for generating oxygen plasma within the reactor 5 and means for introducing aqueous vapor entrained in carrier gas into the reactor. Applicant respectfully asserts that claims 14, 15 and 17 do not structurally read on the device disclosed in Hongo, and that this rejection should be withdrawn.

Claims 14 and 15 have been rejected under 35 U.S.C. §102(b) as being anticipated by Hagopian, U.S. Patent No. 3,620,792 (hereafter "Hagopian"). The Examiner has cited Example 5 of Hagopian, Col. 5, lines 12-31, as the anticipating reference. Hagopian only discloses "a suitable reaction vessel" (line 14) and several means-plus-function recitals. For

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example, the components corresponding to Applicant's agitator assembly 2 is recited as nothing more than "means for agitation" (line 15) with no performance or structural characteristics specified. In fact, there are no performance or structural characteristics specified for any of the components. Hagopian is not sufficiently detailed or specific to be an enabling anticipating reference. Applicant respectfully asserts that claims 14 and 15 do not structurally read on Hagopian Example 5 and that this rejection should be withdrawn.

Claims 14 and 17 have been rejected under 35 U.S.C. §102(b) as being anticipated by Farnell, U.S. Patent No. 3,508,882 (hereafter "Farnell"). The autoclave 1 of Farnell includes a stirrer 16 and raw material inlet port 11. The stirrer agitates the reactant solution and the inlet port allows for new raw materials once a batch is processed so that an additional batch can be processed when product is removed through outlet conduits 14 and 15. This apparatus lacks structural and related functional features of the instant invention, such as: the chamber 4 with reactor 5 positioned coaxially therein; stirring vanes 16 and coils 18 that are capable of deagglomerating pigment particles and maintaining small size and maximum surface area to that the surfaces of the particles can be stabilized; oxygen plasma generating means; and placement of the inlet (tubular lance 20) so as to increase the dwell time of the process gas. The instant invention does not structurally read on Farnell. Applicant respectfully requests that this rejection be withdrawn.

Claim 14 has been rejected under 35 U.S.C. §102(b) as being anticipated by McKinney, U.S. Patent No. 4,618,478 (hereafter "McKinney"). The reactor 1 is provided with a shaft 7 and stirring blades 11, an inlet air duct 16 with optional water inlet 18, and lead oxide outlet duct 20 (see Col. 4, line 8). The duct 16 is nothing more than an inlet that allows air to be admitted to the interior of the reactor 1 (see Col. 3, lines 62-64) and optionally a stream of water through inlet 18 that communicates with air inlet 16. There is nothing critical about the size, volume or placement of the air inlet. Moreover, the stirring means, shaft 7 and blades 11 have no critical spatial relationship with the interior wall of the reaction chamber (see Col. 3, lines 38-43). As noted above in relation to other cited anticipating references, this reference lacks structural and critical functional features claimed in the instant application. Therefore, the reference does not anticipate claim 14 of the instant application. Applicant respectfully submits that this rejection should be withdrawn.

Remarks in Summation

To anticipate an invention, the reference must disclose each and every limitation of the claim or claims under examination. More specifically, for any claim under review to be

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anticipated under §102(b) by a prior art patent or publication, each element (or limitation) of each claim under review must be identically shown in a single reference. These elements must also be arranged as in the claim under review. *In re Bond*, 15 USPQ2d 1566, 1567 (CAFC 1990). In addition, and importantly, for a prior art reference to anticipate a claimed invention, the reference must enable a person of ordinary skill in the art to produce the claimed invention from a single reference cited against the invention to defeat novelty. See generally *In re Donohue*, 226 USPQ 619 (CAFC 1985). Accordingly, the Applicant has shown, above, by comparing the elements of the claimed invention with the disclosure of each cited reference, that this identity requirement (*viz.*, that one single reference must disclose each and every element of each claim under review) has not been met by any of the references. Moreover, Applicant submits that it is equally important to note that the mere citation of a standard structural feature, such as "a suitable reaction vessel" cannot possibly enable the claimed invention because what may be "suitable" will vary from one set of circumstances to another, and that such disclosure is not only vague and indefinite, but cannot enable one of ordinary skill in the art to produce the invention from the reference without undue experimentation. Similarly, while the references disclose means for stirring a solution of reactants, none of the disclosed impellers, vanes or aerofoils enable the agitator assembly of this invention which provides critical functions of deagglomerating organic pigment particles to maximize particle surface area for stabilization by the plasma activated process gas. For all of these reasons, Applicant respectfully asserts that none of the references anticipate claims 14, 15 or 17, and that all of the novelty rejections should be withdrawn.

Rejection Under 35 U.S.C. §103

Claim 16 has been rejected under 35 U.S.C. §103(a) as being unpatentable over McKinney in view of Tokheim, U.S. Patent No. 1,167,536 (hereafter "Tokheim") or Bliss, U.S. Patent No. 5,037,210 (hereafter "Bliss"). The analysis concerning the components of McKinney in comparison to the instant apparatus, set forth in the previous section of this paper, is applicable here. Applicant respectfully requests the Examiner to bear that analysis in mind in considering this section of the paper, without having to rescript it here. McKinney discloses a reactor system for producing lead oxide, PbO ("litharge"). Lead oxide is used in lead batteries and leaded glass and may be used as a precursor for making Pb₃O₄, a bright red powder known commercially as red lead. The main structural and functional features of the McKinney apparatus have been set forth above, and will not be repeated here. Tokheim discloses a cylindrical tank with an inverted conical bottom primarily directed to the dry

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cleaning industry. Bliss discloses a mixing implement for mixing powdered solids, such as plaster, cement mix, or pancake batter, with liquids. The implement essentially consists of a rotatable shaft with a coil attached perpendicularly to the shaft at one or both ends of the shaft. The coils are useful for breaking up clumps of wetted powder and dispersing them in the liquid so that they suspend in the liquid medium.

For a finding of obviousness under §103(a), the prior art references must teach or suggest all of the claim limitations. The reference must pertain to a field that is at least analogous to the field of the application under examination. There must be some objective showing that the inventor would have been motivated to modify the primary reference in some way, with some reasonable expectation of success for the modification. Where primary and secondary references are relied upon, as here, there must be an objective showing that a reasonably skilled practitioner of the relevant art would have known of the primary and secondary references and been motivated to combine the references with some reasonable expectation of success in achieving the goals and results of her invention. The ultimate determination is made on the entire record.

The instant application is directed to a device for producing stabilized organic pigment molecules that have been modified by treatment with plasma activated process gases following mechanical dispersion. The pigments so produced are useful as ink jet printer inks. The primary elements of the apparatus of the invention are: (i) a chamber, preferably sealed; (ii) a reactor coaxially positioned within the chamber; (iii) means for introducing process gas into the reactor; (iv) dielectric barrier discharge means (for generating oxygen plasma in the generator); and (v) a deagglomerating agitator assembly including rotating vanes with flexible coils attached thereto. The deagglomerating agitator breaks up particles of organic pigment to increase the surface area so that activated process gas can stabilize the particles; the stabilization is most effective when the particles expose the maximum possible surface area to the process gas. Additionally, the process gas is activated by exposure to oxygen plasma in the reactor. The reactor is built with safety considerations in mind, and the process inherent to the reactor apparatus reduces the hazards associated with highly exothermic prior art organic pigment oxidation reactions. This, then, is essentially the field of this particular invention, and some of the primary objects and goals of the apparatus claimed.

The primary reference, McKinney, is directed to a reactor for producing lead oxide. The primary goals are to produce products (PbO) of relatively small particle size and to achieve a centrifugal separation of the different lead oxide products produced by the reactions

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inside the apparatus. The resulting products are most useful as components in batteries and glass. The secondary references relate to an industrial tank for mixing drycleaning solvents (Tokheim) and a mixer implement for breaking up clumps of wetted powders so that the powdered ingredients of cement, plaster, or pancake batter, and the like, suspend more uniformly in the liquid (such as water or milk). These fields are not analogous to the field of the instant application. It is unlikely that an ink jet ink process chemist would turn to McKinney for guidance on designing a reactor for producing stabilized ink jet pigment materials. Given the disclosure of McKinney, the apparatus of the instant application could not be made with only minor variations to the McKinney apparatus. Faced with that obstacle, the ink jet pigment chemist would not be motivated to combine McKinney with either Tokheim or Bliss, alone or together, to arrive at the apparatus claimed herein. There would be no reasonable expectation of success in making any of those modifications or combinations. Nor do the references teach or suggest all the elements of claim 16.

In summary, the different fields of McKinney, Tokheim and Bliss are not analogous to the field of the instant application. There are no simple modifications that could be made to McKinney to produce the apparatus of this invention. A skilled practitioner in the art to which the field of the instant application pertains would very likely not have been aware of the primary and secondary references cited by the Examiner, and would not have been motivated to combine them, with a reasonable expectation of success, to achieve the invention of the apparatus claimed herein. Accordingly, claim 16, dependent from amended claim 14, is not obvious over McKinney in view of Tokheim or Bliss. Applicant respectfully asserts that this rejection should be withdrawn.

SUMMARY

Applicant respectfully requests reconsideration of claims 14-17 as amended, and consideration of new claim 18. Applicant believes that all the stated grounds for rejection have been rendered moot or otherwise overcome, and that this paper constitutes a complete and responsive reply to the Non-Final Office Action mailed July 7, 2005. Based upon the amendments and remarks presented above, Applicant submits that this application is now in condition for allowance. A Notice of Allowance is respectfully solicited.

Applicant believes that no fee is due with this Amendment. Should a fee, not accounted for herein, be due, please charge such fee to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company).

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Should the Examiner have any questions about the application or the content of this paper, please call the undersigned at the telephone number provided below.

Respectfully submitted,



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